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DENTON,H.R.	Office of Nuclear Reactor Regulation
REID,R.W.	Operating Reactors Branch 4

SUBJECT: Requests exemption to 10CFR20.305 to allow disposal by incineration of radioactively contaminated reactor coolant pump & turbine bldg sump oil.Approval needed by 800801. Exemption fee encl.

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DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28242

WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

May 19, 1980

TELEPHONE: AREA 704
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Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. R. W. Reid, Chief
Operating Reactors Branch No. 4

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

Dear Sir:

Pursuant to 10CFR 20, §20.302, a request is hereby made to dispose of exempt quantities of contaminated oil by burning. Documentation in support of this request is attached.

Currently at Oconee Nuclear Station, there are twenty-four 55-gallon drums which contain exempt quantities of certain radio nuclides in used oil. It is desired to burn this oil as fuel in the Auxiliary Boiler at Oconee, As documented in the attached, this is the most viable option available. It is requested that this request be reviewed and approved by August 1, 1980. Significant amounts of oil need to be disposed of prior to the fall outage of Oconee 3. Your prompt response in this matter is appreciated.

Pursuant to 10CFR 170, §170.22, a check in the amount of $4,000 is provided as the required license fee.

Very truly yours,

William O. Parker, Jr.

RLG:scs
Attachment

A001
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1/1
w/check:
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1.0 INTRODUCTION

The purpose of this document is to request exemption to 10CFR20.305 in order to allow disposal by incineration of radioactively contaminated Reactor Coolant Pump motor (RCP) oil and Turbine Building sump (TBS) oil. Presently at Oconee Nuclear Station there are approximately 2,255 gallons of this oil stored in several 55 gallon drums. This oil is contaminated to levels which are less than the exempt quantities specified in 10CFR31.

This document describes the background of this problem, the methods of disposal which have been evaluated, the justification of incineration as the preferred method and the proposed scenario for disposal.

2.0 BACKGROUND

The generation of contaminated oil at Oconee Nuclear Station comes from two main sources, the RCP motor oil and the oil in the Turbine Building sumps. The oil in the sumps becomes contaminated during OTSG primary-to-secondary leaks and usually contains water and other sump contaminants. The oil from the RCP motors comes contaminated because the oil reservoirs are exposed to the containment atmosphere by a breather line. The RCP oil is changed out during refueling outages once every two years and results in approximately 1,000 gallons for each Oconee unit (250 gal/pump).

Efforts have been taken to minimize the quantities of contaminated oil generated. Both Duke and Mobil Oil Company have participated in several efforts to extend the useful life of the oil by decreasing the rate of degradation product buildup. Additionally, care is taken to ensure the oil will not be contaminated when removed from the pumps. Due to the design of the RCP, there is no way to prevent the oil from becoming contaminated. Station personnel segregate the oil to prevent cross contamination of drums, and care is taken to properly sample and document levels of contamination of each drum. By these efforts, the quantities of contaminated oil has been minimized.

Although the production of contaminated oil has occurred since the beginning of commercial operation, it has not been a concern until recently. Until almost two years ago the waste oil produced was segregated according to the presence of radioactivity. Non-contaminated waste oil was placed in the conventional waste oil storage tank and

2.0 BACKGROUND (cont'd)

periodically sold to a waste oil dealer. Contaminated oil was mixed with other contaminated waste and solidified for shipment to Barnwell, S.C. for disposal. During 1978, South Carolina prohibited the disposal of oil at Barnwell except when it was adsorbed on imbiber beads and solidified. This process was relatively expensive and doubled the volume of disposed waste . Additional test results eliminated this disposal method, before any action could be taken to use this process. Presently, there is no means of disposing of waste oil at Barnwell.

At Oconee, the RCP oil is drained from the motor oil reservoirs directly into 55 gallon drums. A sample is taken of each drum and an isotopic analysis is performed on each sample. The drums which contain radio-activity are marked and stored for future disposal. The predominant isotopes found thus far have been Cs-134, Cs-137, Co-58, and Co-60. The results of samples taken from each drum are provided in Table 1.

The decision to dispose of the oil at this time is based mainly on the lack of storage space available at Oconee for 55 gallon drums and the potential fire hazards associated with oil storage. There is no available tank storage space for contaminated oil and it is undesirable to mix the contents of the drums since some of the oil is more highly contaminated than the rest. Since the oil is contaminated, it also presents an additional contamination control problem for Health Physics while it is being stored.

3.0 EVALUATION OF DISPOSAL ALTERNATIVES

Since the time that Barnwell stopped receiving oil in solidified wastes for burial, several disposal alternatives have been evaluated. The following alternatives have been considered:

1. Solidification and shipment to either Beatty, Nevada, or Richland, Washington for burial,

2. Chemical decomposition/oxidation of the oil,

3. Burning,

4. Provision of a long term storage tank for contaminated oil.

The first alternative investigated was solidification and shipment to a western burial site. Upon inquiry concerning solidification of oil we found that the oil could be absorbed with "Speedy Dry" and then solidified with redi-mix concrete in 55 gallon drums. At the time this was investigated the costs were estimated to be over $20,000 and Oconee has no means of performing a cement solidification.

Additionally, during this period of time, both burial sites were temporarily closed. Because of uncertainity in the availability of this option, it is not considered to be viable.

A second alternative investigated utilized ozone and ultraviolet light to oxidize the oil. This method has been used in the chemical industry

on various chemicals which cannot be disposed of by normal means. The process seems to be very promising, but has not been applied to waste oils involving radioactive contamination. In order to develop such a technology, more research and design is required. Such an R and D project does not seem feasible at this time, but we are still considering the possibility of a future system using this technology.

The third alternative investigated was burning. Since the oil is contaminated with very low levels of radioactivity, Duke determined that a large portion of the oil could be disposed of as exempt quantities of radioactive wastes. One use for the exempt waste oil is recycle, but this is prohibited by regulations. Since the oil cannot be reused as a lubricant, the only other cost effective method of disposal is to burn the oil to utilize the energy. The only available means of using the waste oil for energy production within the Duke system is the Auxiliary Boiler at Oconee. This alternative has been carefully considered and appears to be the most cost effective and conservative means of disposal. The costs involved are manpower requirements and a modification to the Auxiliary Boiler oil feed system. These costs are met by the cost savings in normal fuel oil consumptions. The environmental impact of this alternative is considerably less than that involved with solidification and burial. (For environmental evaluation, see Section 4.0.)

The last alternative to be considered was the provision of a long term contaminated waste oil tank. Although this would eliminate the problem

of insufficient drum storage space, it does not address the true problem. Such a solution is not in keeping with good radwaste management practices since it would eliminate the segregation of exempt and non-exempt oil, and would add to the inventory requirements of the radwaste management function.

4.0 JUSTIFICATION FOR BURNING

The most judicious method for disposing of exempt quantities of oil available to Duke Power Company at this time is burning. The advantages of burning over the other alternatives are as follows:

4.1 Burning eliminates the need for solidification. Since urea formaldehyde (UF) does not work well with large concentrations of oil, and UF is Duke's present solidification media, the elimination of the need for solidifying the oil is a significant advantage.

4.2 Burning eliminates transportation of the oil to a western burial site.

4.3 Burning has less environmental impact than burial since it does not use any of the limited burial space available to the industry. This is in keeping with the industry's efforts to reduce solid waste volumes.

4.4 Burning allows Duke to dispose of the oil and in the process, produce useful energy.

4.5 The radiological impact of burning is insignificant because the total radioactivity content of the oil is low. The effluent released to the environment during burning will also be insignificant because the oil will be fed to the boiler from each exempt quantity drum individually, and the oil will be further diluted by the fuel oil by which the boiler will be operating. The concentrations released from the stack will be

very low since the total flow out the stack is approximately 100,000 cfm. Assuming the waste oil constitutes 50% of the oil feed to the burner, the concentration of radioactivity leaving the stack every second during the burn will be less than 3% of the limits set forth in Column 1 of Table II in Appendix B to 10CFR20 for the radionuclides identified in the exempt oil.

The total radioactivity content of the exempt quantity oil presently stored at Oconee is less than 0.003% of the annual airborne release limits at Oconee for the particular radionuclides contained in the oil. (See Table I)

The only radionuclides identified in the exempt quantity oil are Co-58, Co-60, Cs-134, and Cs-137. Because the radioactivity content is low, the airborne dilution is great, and the manner in which the release rate can be controlled is practical, burning has the least environmental impact and is the most technically feasible means of disposal. The radiological impact of burning is negligible and is in keeping with the ALARA concept of minimizing radiological exposures and environmental releases.

5.0 DISPOSAL SCENARIO

The burning will be performed in the Auxiliary Boiler at Oconee. This fired boiler is a Babcock & Wilcox design type FM117-97B with a capacity of 115,000 lbs. of steam per hour. The maximum flow rate of oil feed is 18.8 gpm, and the oil is atomized by air and steam in the Coen burner nozzles. The flow rate from the stack is approximately 100,000 cfm. The Mobil Oil Company, the Coen Burner Company and B&W have been consulted and there are no technical problems which would preclude the burning of the type of oil involved.

At the present time, the contaminated oil is stored in several 55 gallon drums. The following is a description of the steps we plan to take in disposing of the oil.

5.1 The oil will be pumped from the drums in which it is stored through particulated filters into new 55 gallon drums. Each of the new drums will be sampled and an isotopic analysis performed. Based on this sampling and analysis, the drums will be identified as containing exempt quantities, or non-exempt quantities of the radionuclides identified in each particular drum.

5.2 The oil feed system for the Auxiliary Boiler will be modified to allow a tap onto the suction side of the feed pumps.

5.3 The drums of RCP oil which contain exempt quantities of radioactivity will be transferred to the boiler area. Once the boiler is at steady

state operation, the waste oil will be pumped into the feed line of the boiler from each drum at a rate which will ensure proper mixing of the two oils for burning.

5.4 The drums of non-exempt waste oil, Turbine Building Sump oil, and oil filters will be labeled and stored for future disposal by means other than burning.

TABLE 1

CONTAMINATED OIL SAMPLES
(Exempt Quantities)

Sample No.	CO-58 a) μCi/ml b) μCi/55 gal	CO-60 a) μCi/ml b) μCi/55 gal	CS-134 a) μCi/ml b) μCi/55 gal	CS-137 a) μCi/ml b) μCi/55 gal
2	<MDA*	<MDA	a) 2.946E-6 b) 4.0516E-1	a) 9.636E-6 b) 2.0062
6	<MDA	a) 8.484E-7 b) 1.7664E-1	a) 9.803E-7 b) 2.041E-1	a) 3.334E-6 b) 6.9414E-1
8	<MDA	<MDA	<MDA	a) 2.943E-6 b) 6.1273E-1
9	<MDA	<MDA	a) 9.500E-7 b) 1.9779E-1	a) 5.159E-6 b) 1.0741
11	a) 7.350E-7 b) 1.5303E-1	<MDA	a) 2.761E-6 b) 5.434E-1	a) 1.082E-5 b) 2.2527
14	<MDA	<MDA	<MDA	a) 2.130E-7 b) 4.4347E-2
17	<MDA	<MDA	<MDA	a) 6.199E-7 b) 1.2906E-1
18	<MDA	a) 1.125E-6 b) 2.3423E-1	a) 4.145E-7 b) 8.6299E-2	a) 2.242E-6 b) 5.0468E-1
20	<MDA	<MDA	<MDA	a) 4.575E-6 b) 9.5252E-1
21	<MDA	<MDA	a) 4.489E-6 b) 9.3461E-1	a) 1.501E-5 b) 3.1251
22	<MDA	<MDA	<MDA	a) 1.064E-6 b) 2.2152E-1
23	<MDA	<MDA	a) 3.408E-6 b) 7.0955E-1	a) 9.764E-6 b) 2.0329
25	<MDA	<MDA	<MDA	a) 7.042E-7 b) 1.4661E-1

TABLE 1 (cont'd)

CONTAMINATED OIL SAMPLES
(Exempt Quantities)

Sample No.	CO-58 a) µCi/ml b) µCi/55 gal	CO-60 a) µCi/ml b) µCi/55 gal	CS-134 a) µCi/ml b) µCi/55 gal	CS-137 a) µCi/ml b) µCi/55 gal
26	<MDA*	<MDA	a) 1.641E-6 b) 3.4166E-1	a) 6.639E-6 b) 1.3822
28	<MDA	a) 9.101E-7 b) 1.8948E-1	a) 4.181E-6 b) 8.7048E-1	a) 1.182E-5 b) 2.4609
29	<MDA	<MDA	a) 1.671E-6 b) 3.479E-1	a) 6.085E-6 b) 1.2669
30	<MDA	<MDA	<MDA	a) 1.267E-6 b) 2.6379E-1
31	<MDA	<MDA	<MDA	a) 1.463E-6 b) 3.046E-1
32	<MDA	<MDA	<MDA	a) 7.049E-7 b) 1.4676E-1
35	<MDA	<MDA	a) 1.087E-6 b) 2.2631E-1	a) 3.041E-6 b) 6.3314E-1
42	a) 5.668E-7 b) 1.1801E-1	<MDA	a) 7.647E-7 b) 1.5921E-1	a) 9.790E-7 b) 2.0383E-1
45	<MDA	<MDA	<MDA	a) 1.126E-6 b) 2.3443E-1
47	<MDA	<MDA	a) 2.966E-6 b) 6.1752E-1	a) 7.992E-6 b) 1.6639
48	<MDA	a) 2.830E-7 b) 5.8921E-2	a) 1.270E-6 b) 2.6441E-1	a) 2.652E-6 b) 5.5215E-1

*MDA Values

CO-58	1.76E-7 µCi
CO-60	1.76E-7 µCi
CS-134	1.76E-7 µCi
CS-137	2.61E-7 µCi